

REMARKS

Claims 1, 3-9, 11-15 and 21 are now in the application. The recent telephonic interview so courteously granted by examiner Oh is hereby noted with appreciation. Claim 1 has been amended along the lines discussed during the interview to recite “wherein a reactant substrate is selected from the group consisting of cyclohexanone, cyclobutanone, unsaturated hydrocarbons having 2 to 15 carbon atoms, a compound having at least one ethylenic double bond and a group selected from –COOH, –CN, –COOR or –OR, wherein R being an alkyl, cycloalkyl, aryl or allylalkyl substituent; or an aryl, allylalkyl, halogen, nitro, sulfo, carbonyl, hydroxyl or ether group, an oxidizing agent used is selected from molecular oxygen, hydrogen peroxide, cumene hydroperoxide, tert-butyl hydroperoxide, peracetic acid, oxygen-hydrogen mixed gases, dinitrogen monoxide, and iodosylbenzene, a reaction temperature is not lower than room temperature, but not higher than 250°C, and a reaction pressure is not lower than ordinary pressure but not higher than 2×10^7 Pa, and wherein the reaction is selected from aldehyde formation from a primary alcohol having 2 to 15 carbon atoms, carboxylic acid formation from an aldehyde having 2 to 15 carbon atoms, and ketone formation from a secondary alcohol having 2 to 15 carbon atoms if the liquid-phase oxidation reaction is hydroxyl group oxidation”. Also, claim 9 has been amended to recite “heteropolyoxometallate anions having tungsten atom” in place of “heteropolyoxometallate anions comprising tungsten atom”, as suggested by the examiner during said interview, for purposes of clarification and not to limit its scope.

Basis for the above amendment to claim 1 can be found at page 21, line 13 to page 22, line 14 and EXAMPLES 29-30, page 10, lines 6-13, page 25, lines 17-28 and page 9, lines 11-16. Basis for new claim 21 can be found at page 21, line 13 to page 22, line 14 and Examples 29-30. The amendments to the claims and new claim 21 do not introduce any new matter.

Claims 1, 3-9 and 11-15 were rejected under 35 USC 112, first paragraph. The Office Action states that the specification fails to describe how all kinds of hydrocarbons, alkenes, ethers, alcohols and/or ketones can undergo the liquid catalytic oxidation process and fails to describe the relationship between all kinds of hydrocarbons in the final product during the processing steps of making the desired product. Claims 1, 3-9 and 11-15 were also rejected under 35 USC 112, first paragraph as lacking enablement for all kinds of hydrocarbons, alcohols, ethers, and/or ketones. The above amendments to claim 1 overcome these rejections.

In particular, claim 1 as amended now recites the substrate and the oxidizing agent used for the reaction, the reaction temperature, and the reaction pressure. Also, claim 1 as amended recites a liquid-phase oxidation reaction if the substrate is an alcohol. Also, amended claim 1 includes compounds in the solid or gaseous form under the reaction temperature and pressure in the reaction substrate. Even if the substrate is in the solid or gaseous form, the liquid-phase oxidation reaction can be performed provided a solvent which can dissolve the substrate is properly selected. In this case, the substrate dissolved in the solvent, the oxidizing agent, and catalyst are in contact with each other, which promotes the reaction. In addition, the substrate is specified in the claims not to include tertiary alcohols, if the substrate is an alcohol.

Claims 1, 3-9 and 11-15 were rejected under 35 USC 112, second paragraph as being indefinite. The Office Action criticized the terms “a method of liquid-phase oxidation using a tungsten species” and “comprising tungsten atoms”. These rejections of the claims have been overcome by the amendments to the claims and/or are not deemed tenable. For instance, as discussed above, claim 1 has been amended to recite “wherein a reactant substrate is selected from the group consisting of cyclohexanone, cyclobutanone, unsaturated hydrocarbons having 2 to 15 carbon atoms, a compound having at least one ethylenic double bond and a group selected from -COOH, -CN, -COOR or -OR, wherein R being an alkyl, cycloalkyl, aryl or allylalkyl substituent; or an aryl, allylalkyl, halogen, nitro, sulfo, carbonyl, hydroxyl or ether group, an oxidizing agent used is selected from molecular oxygen, hydrogen peroxide, cumene hydroperoxide, tert-butyl hydroperoxide, peracetic acid, oxygen-hydrogen mixed gases, dinitrogen monoxide, and iodosylbenzene, a reaction temperature is not lower than room temperature, but not higher than 250°C, and a reaction pressure is not lower than ordinary pressure but not higher than 2×10^7 Pa, and wherein the reaction is selected from aldehyde formation from a primary alcohol having 2 to 15 carbon atoms, carboxylic acid formation from an aldehyde having 2 to 15 carbon atoms, and ketone formation from a secondary alcohol having 2 to 15 carbon atoms if the liquid-phase oxidation reaction is hydroxyl group oxidation”, as discussed during said interview.

In addition, claim 9 has been amended to recite “heteropolyoxometallate anions having tungsten atom” as suggested by the examiner during said interview.

Claims 1, 4-5 and 7-9 were rejected under 35 USC 102(b) as being anticipated by WO 98/54165 to Neumann et al. (herein also referred to as Neumann). Neumann does not anticipate claims 1, 4-5 and 7-9.

The catalyst suggested in Neumann comprises tungsten and zinc as the component of one compound. This is quite different from the “coexist” form of the catalyst in the present invention. In addition, the active site of the catalyst in Neumann is ruthenium; whereas, the active site of the catalyst of the present invention is tungsten. Also, Neumann fails to disclose calcination of the catalyst.

Claims 1, 3-7 and 9 were rejected under 35 USC 102(b) as being anticipated by WO 94/21583 to Brown et al. (hereinafter referred to as Brown).

Brown fails to anticipate claims 1, 3-7 and 9. Brown suggests an epoxidation reaction with tungsten supported on the support. However, nothing is disclosed or suggested therein about the coexistence of the third element or improvement of the catalytic activity performance or prevention of the leaching of catalyst components into liquid reaction mixtures due to the coexistence of the third element.

The cited references fail to anticipate the present invention. In particular, anticipation requires the disclosure, in a prior art reference, of each and every recitation as set forth in the claims. *See Titanium Metals Corp. v. Banner*, 227 USPQ 773 (Fed. Cir. 1985), *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 1 USPQ2d 1081 (Fed. Cir. 1986), and *Akzo N.V. v. U.S. International Trade Commissioner*, 1 USPQ2d 1241 (Fed. Cir. 1986).

There must be no difference between the claimed invention and reference disclosure for an anticipation rejection under 35 U.S.C. 102. *See Scripps Clinic and Research Foundation v. Genetech, Inc.*, 18 USPQ2d 1001 (CAFC 1991) and *Studiengesellschaft Kohle GmbH v. Dart Industries*, 220 USPQ 841 (CAFC 1984).

In view of the above amendment, applicant believes the pending application is in condition for allowance.

In the event the Examiner believes that another interview might serve to advance the prosecution of this application in any way, the undersigned attorney is available at the telephone number noted below.

Please charge any fee due with this response to our Deposit Account No. 22-0185, under Order No. 21581-00298-US1 from which the undersigned is authorized to draw.

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Respectfully submitted,

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